Planting Trees in Designed and Built Community Landscapes

Checklists for Success

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I Dedicate this Publication to Honor the Memory and Legacy of Sharon Ossenbruggen (1943-1998), My Colleague and Friend. It has been both a pleasure and a privilege as we forged a partnership that spanned nearly twenty years, sharing a cumulative, evolving vision that exemplary built landscapes with trees could (and must) be created with a sensitivity to integrating both ecological and cultural connections.

—Mary Reynolds

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Cover

The Tree, 1966, a stabile mobile by Alexander Calder (1898-1976). Missouri Botanical Garden, St. Louis, Missouri. Used with permission from the Missouri Botanical Garden.

Trees create green spaces in communities. The right trees in the right places benefit you, your home, and your community now and in the future. It is essential to select *living* trees to create a sense of place within communities.

This publication helps citizens create community green spaces. It encourages both experts and amateurs to plant and grow trees correctly, and to properly maintain new and older plantings. It is designed to be used in contract planting specifications for all public and private tree planting projects.

Trees growing in small parks and commons, along streets, and in the yards and gardens of neighborhoods provide a mosaic of green landscapes within a community. As well as providing beauty, trees moderate the effects of heat, sound, air pollution, excess storm water runoff, and soil erosion. Trees also provide a living space for wildlife, enhance property values, and contribute to the economic vitality of communities.

Greening and maintaining a community landscape is a long term commitment that depends on *people!* Designed, built landscapes with living trees require an infusion of human energy to survive. Parks and other built landscapes need people for completion.

CHECKLISTS FOR SUCCESS

Presented here are the current recommendations and ecological guidelines for tree selection, planting, and after-care based on good science and cutting edge research. For detailed information refer to sources listed at the end of the guide. Six checklists help you select, plant, and care for trees:

Checklist 1: Site Selection (where to plant)
Checklist 2: Tree Selection (what to plant)
Checklist 3: Useful Tools (planting correctly)
Checklist 4: Preparing a Site (planting correctly)
Checklist 5: Planting (planting correctly)
Checklist 6: After-Care (long-term maintenance plan)

Other information includes "Pruning Guidelines" and "Resources: Tree Selection and Care."

Take this guide with you as you select a site and the correct tree for it. Mark as many boxes as necessary in each checklist. Use the center section when planting.

We live in and among ecosystems. Let's help trees grow to be safe, healthy, and attractive in sustainable, *living* community landscapes.

WHY PLANT A TREE?

Decide why you wish to plant. The reasons will help you choose the site. The site you select, whether in your own yard, in a community park, or on the street, affects the choice of tree.

- memorial/gift
- privacy
- reduce soil erosion
- winter windbreak
- summer cooling
- reduce air pollution
- increase property value
- spring bloom/fall color
- fruit/nuts
- landscape design
- wildlife habitat
- sight or sound barrier

CHECKLIST 1: SITE SELECTION

Where will you plant your tree?

- ☐ public land
- ☐ private land
- ☐ lawn
- ☐ rooftop
- ☐ by a patio
- ☐ garden
- ☐ along streets
- ☐ park
- ☐ parking lot
- ☐ landfill
- ☐ municipal building
- ☐ golf course
- ☐ school/playground
- ☐ town green or common

Describe the site:

- ☐ underground utilities
- ☐ near heavy traffic
- ☐ overhead utility wires
- ☐ near winter salted roads
- ☐ near walkway, driveway, or sidewalk
- ☐ sunny
- ☐ shady
- ☐ dry
- ☐ wet

Check soil conditions:

- ☐ severely disturbed/ building rubble
- ☐ shallow soil to bedrock
- ☐ sandy
- ☐ rocky
- ☐ clay
- ☐ silt/loam

Estimate:

Space between curb and sidewalk _____

Lot size _____

Fitting the tree to the site:

- A tree's mature size and shape must be of the proper scale to fit the site and surrounding buildings.
- Trees have roots. Roots spread beyond the branch area of the tree. Most roots are found in the top 18" of soil; most absorbing roots are found in the top 6" of soil.
- Trees crowded in small street spaces may crack sidewalks and paved areas.
- Avoid planting under overhead wires and above underground utilities.
- Do not plant trees near building foundations or walls.
- If you plan to plant near the street or in a parking lot, know the snow removal plans.
- Do not plant trees that produce nuts or large fruit in pedestrian areas.
- Determine the necessary root growth space for the species you select. Think of clustering trees in a park setting or a parking lot to provide larger soil volumes for safe root growth. Grouping spaces as contiguous pits to provide shared soil volumes is recommended, rather than digging several individual pits. Groupings create their own small environments and may survive better.
- Identify legal restrictions for planting for both public and private property.

CHECKLIST 2: TREE SELECTION

Which species?

Show Checklist 1 to the nursery or garden center professional and request a choice of trees appropriate for your site. Ask if the nursery or garden center guarantees its plant material. Note responses in given spaces.

What is tree's mature height? _____

What is tree's projected longevity? _____

How fast will this tree grow? _____

What is tree's mature shape? _____

Is it cold hardy for your area? _____

What are its soil requirements? _____

Does it require a shady or sunny site? _____

Does it require wet or dry site? _____

Is it sensitive to salt? _____

Describe flowers and fruits. _____

What is the autumn/spring color? _____

Is the species unusually susceptible to certain insects or disease, or to storm damage? _____

Note: In a community setting be sure to choose a variety of species. Do not plant large numbers of the same species.

Note species you choose:

Choice 1 _____

Choice 2 _____

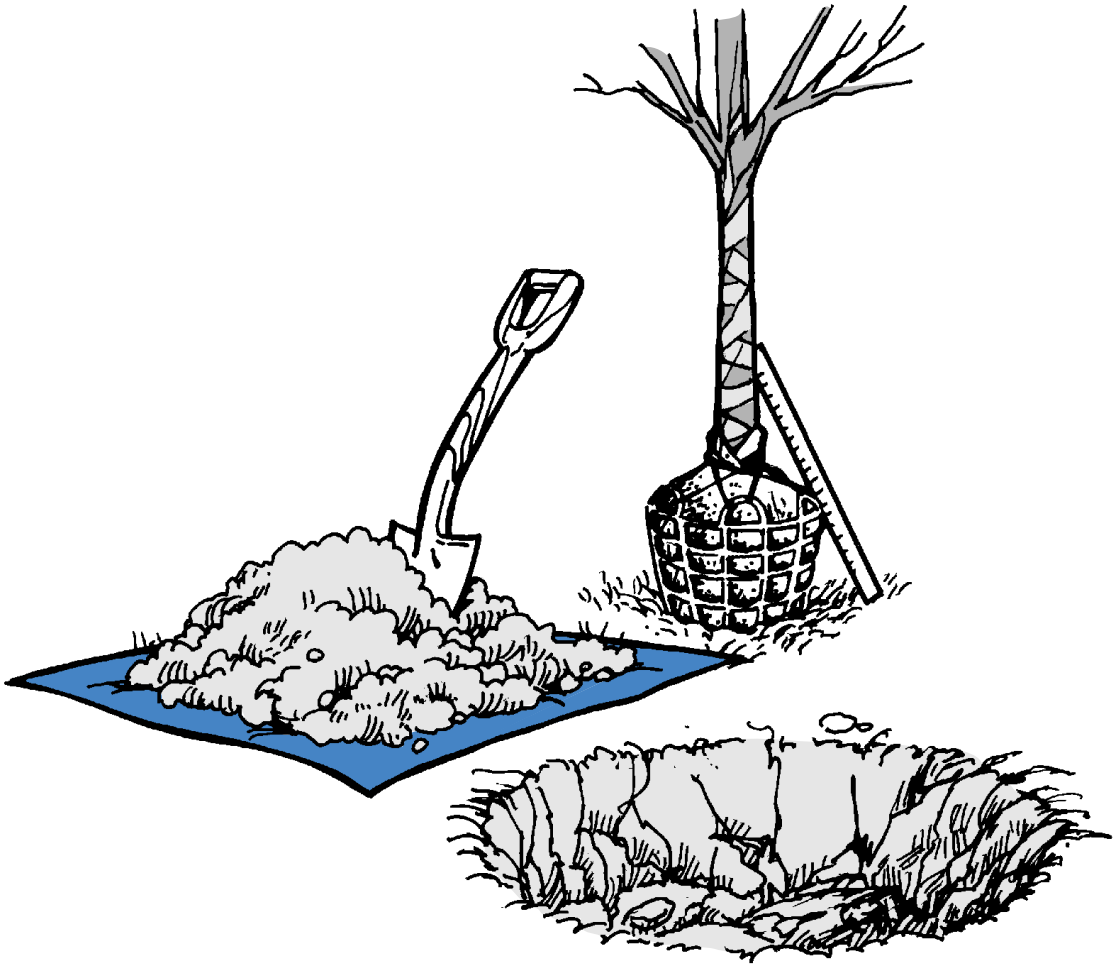
Which particular tree?

Now carefully inspect the trees to choose the healthiest ones with the best form. Reject trees that have:

- double stems or multiple bunches of stems. Look for a straight, single stem.
- severe pruning cuts. See "Pruning Guidelines."
- dead bark, cankers, or signs of disease or insects on trunk or branches.
- paint on wounds or pruning cuts.
- tight, vertical branches where bark is squeezed between two branches or between trunk and branch.

For commercial municipal contracts, specify that plant material meets the American Standard for Nursery Stock. See "Resources: Tree Selection and Care."

Note: Branches of street trees should be high enough for pedestrians to walk beneath.



Before you dig!

Laws in most states require you to contact utilities.
Most have a central toll free number.
If you damage any underground utilities
you are financially liable.

See "Resources: Tree Selection and Care."

CHECKLIST 3: USEFUL TOOLS

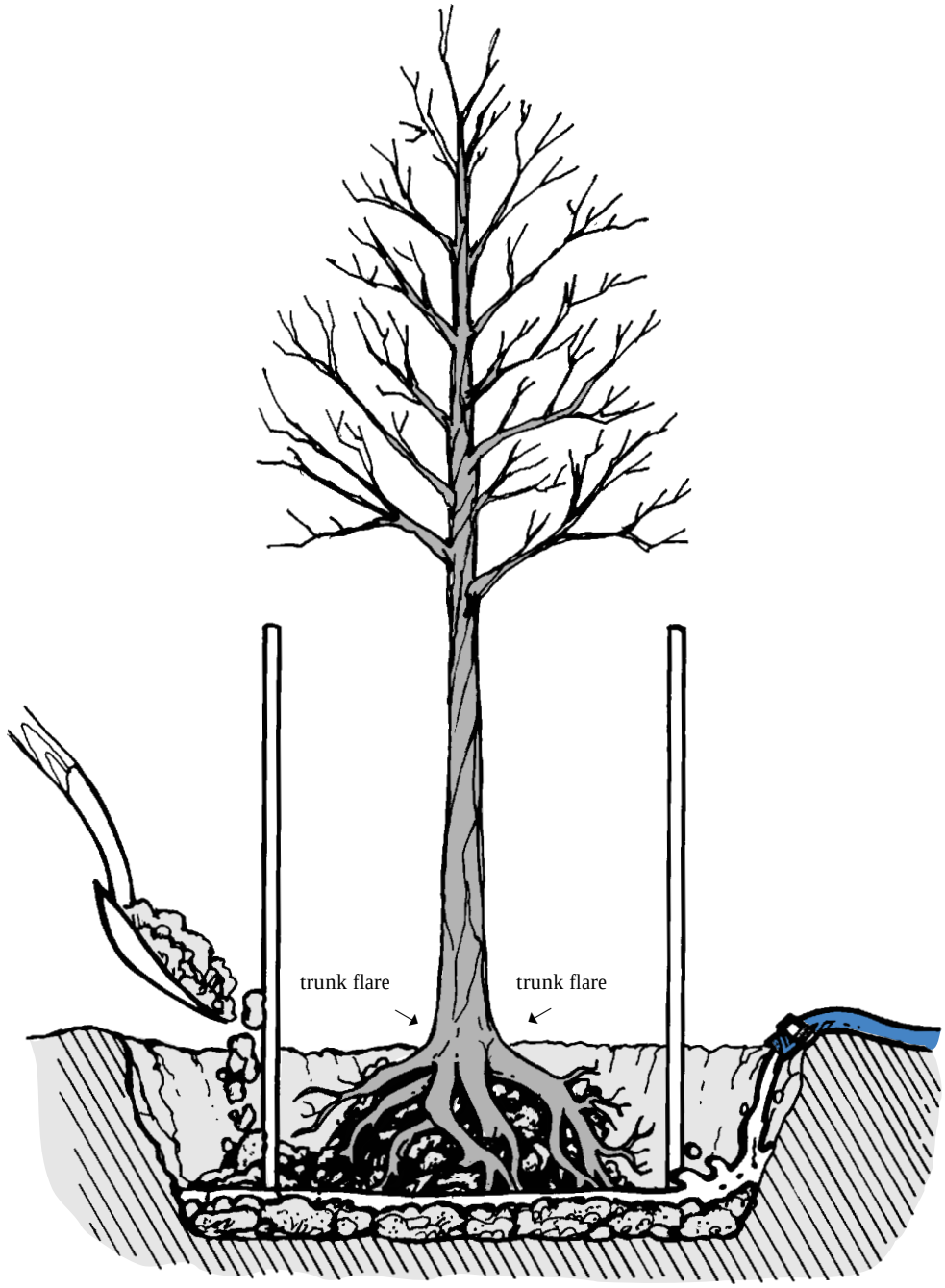
- large spades or shovels
- large tarp to hold soil
- heavy duty wire clippers
- small pruning saw
- hammer or mallet
- measuring stick
- pruning shears
- heavy duty scissors or sharp utility knife
- gloves
- stakes and strapping

CHECKLIST 4: PREPARING A SITE

If possible, prepare the site before you bring in the tree. Keep the root ball well watered and keep the tree in a shaded place until you are ready to plant.

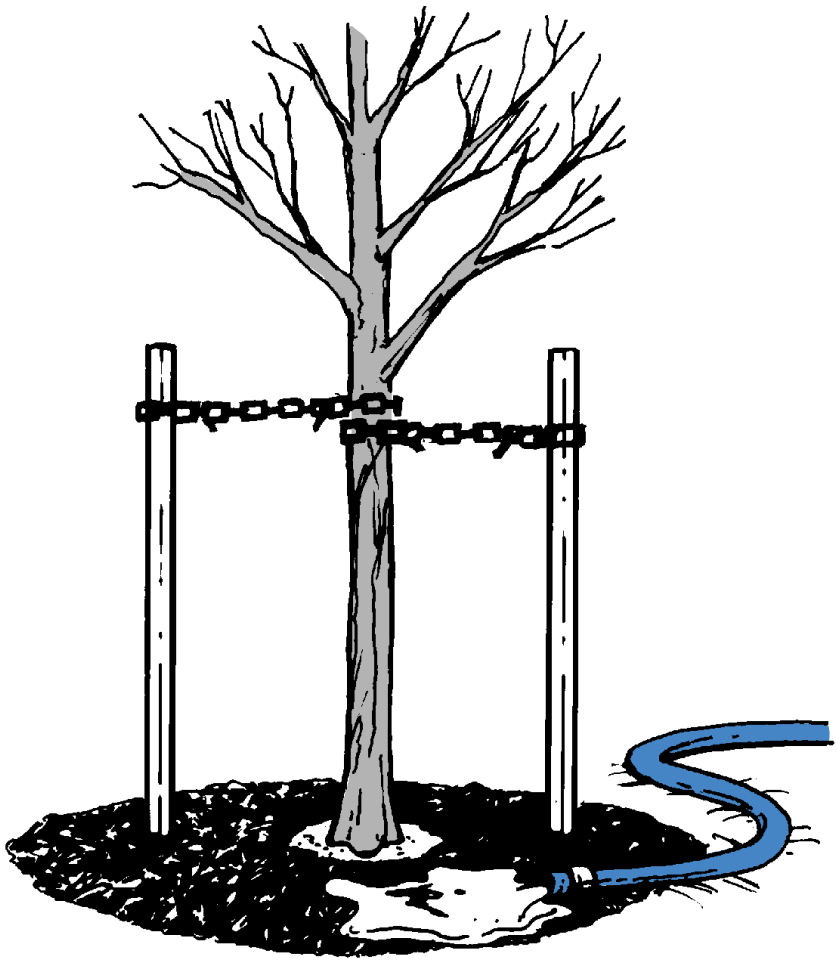
It is imperative to expose the trunk flare on each balled and burlaped tree before the planting site is dug so that the depth of the planting site can be properly measured. The trunk flare is the point where roots begin to branch from the trunk. (The top of the root ball is not always the trunk flare.) Remove burlap from immediate trunk area of tree. Pull back excess soil around trunk of tree to locate trunk flare. Measure the height from the base of the trunk flare to the bottom of the root ball. Dig to the depth of the trunk flare.

- ☐ Trunk flare and top of root ball should be at grade.
- ☐ Dig the space at least 3 times the diameter of root ball.
- ☐ Break up compacted soil. Sides of planting space should not be packed. Leave bottom of space firm.
- ☐ Do not amend soil unless planting in building rubble, poor, or severely disturbed soils.



CHECKLIST 5: PLANTING

- ☐ Lift tree into planting space by root ball, not the trunk.
- ☐ Balance tree upright in center of planting space.
- ☐ For trees in wire baskets, cut and remove wire.
- ☐ Cut away strings and burlap or plastic, exposing root ball. Do not remove soil from root ball.
- ☐ If tree is container grown, cut and remove container.
- ☐ Prune dead or crushed roots and straighten or cut circling roots. Make clean cuts.
- ☐ Begin refilling with soil, watering as you fill to firmly set tree. Gently tamp.
- ☐ Never plant too deep. Trunk flare and top of root ball should be at grade. (Trunk flare may be hidden within the root ball.) Fill soil up to tree base just to where roots begin to branch from trunk.
- ☐ Prune only dead or injured branches. Do not paint wounds.
- ☐ Remove tree wrap, tape, or string on trunk. Trunks should be wrapped only to protect them in transit to planting site.
- ☐ Stake and brace most trees at planting time. Support tree but allow it to move or sway.
- ☐ Use wide, belt-like strapping attached to two sturdy stakes. Do not use rope or wire through a hose.
- ☐ Mulch lightly and evenly with 2" of composted material at least to the diameter of crown of tree. Leave 3" circle of bare soil around the trunk. Deep layers of mulch can be harmful.
- ☐ Do not plant flowers under tree.
- ☐ Do not fertilize at planting time.



CHECKLIST 6: AFTER-CARE

- ☐ Water is the critical factor for tree survival after planting. Deep water regularly throughout first growing season. Allow water to run slowly, soaking the soil, once or twice a week. Do not over water. Water at the perimeter or edge of planting site.
- ☐ Keep lawn mowers and string trimmers away from tree to avoid wounding trunk. Reduce herbicide use near tree and in surrounding lawn.
- ☐ Never fertilize stressed trees. Fertilizer is not tree food. It should be applied (if absolutely necessary) only after first year. When used, fertilizer should be applied at the perimeter or edge of the planting site.
- ☐ Start an annual tree inspection program while tree is young to head off problems early.
- ☐ Replace mulch as needed. Keep grass and weeds out of mulched area. They compete for the same water and elements as tree.
- ☐ Remove stakes and strapping after one year unless site is extremely windy. Do not stake longer than two years.
- ☐ Prune dead or injured branches immediately.
- ☐ Prune while young to maintain size and shape beginning in the second growing season.
- ☐ Do not top trees to reduce height.
- ☐ Call an insured tree care professional for advice on large pruning jobs, hazard trees, and insect or disease problems. Nonprofessionals should never prune near utility wires.
- ☐ Do not plant flowers under a tree. Do not cultivate soil under the tree.
- ☐ Continue deep watering for five years after planting.

Plan in advance to protect established trees on new construction sites.

Fence off wide areas around the trees to protect roots and avoid compacted soil.

Don't allow equipment or materials to be stored near the trees.

Don't change grade levels or cut tree roots when excavating.

Do not top trees.

PRUNING GUIDELINES

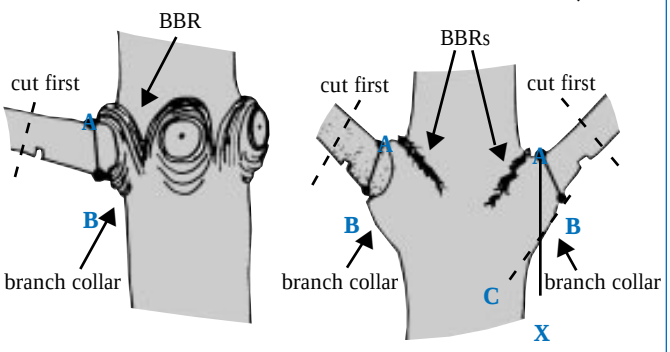
Pruning should be done with a purpose and not as an automatic routine. Remove dead and injured branches and those that are crossing and in contact with other branches. Pruning to maintain size must start when the tree is young. You can not cut a 50 foot tree back into a 30 foot tree in any way that is healthy and safe for the tree. Good pruning doesn't show.

Prune with particular care. Proper pruning cuts may make the difference between a tree having a long, healthy life or a short life. There is no mystery to pruning and once learned it becomes second nature.

Dead and injured branches can be pruned anytime. The best time to prune living branches is in late dormant season or very early spring before leaves begin to open. Use sharp tools. Make clean cuts. Use equipment safely. Never prune near utility wires. Call insured professionals for work near wires, for hazardous trees, or for pruning larger trees.

Conifers
living or dead branches

Hardwoods
dead branch living branch



1. Locate branch bark ridge (BBR) and branch collar.
2. Find target A—outside BBR.
3. Find target B—where branch meets collar.
4. If target B can not be found, drop an imaginary line at AX. Angle AXC equals XAB. Note: Locate the branch collar and make the final cut as close as possible without hitting the branch collar.
5. For stub cut, cut a notch under the branch about 1/4-1/3 through to prevent tearing the bark.
6. Cut the branch, leaving a long stub, then . . .
7. Make final cut at line AB (with care, power saws may make final cuts on the upstroke.)

Do not:
- make flush cuts behind BBR.
- leave stubs, living or dead.
- injure or remove the branch collar.
- paint cuts.

RESOURCES: TREE SELECTION AND CARE

Shigo, A.L. 1994. **Tree Basics.** 40 pp. Available from Shigo and Trees, Associates, P.O. Box 769, Durham, NH 03824-0769.

Shigo, A.L. 1991. **Modern Arboriculture.** 424 pp. Available from Shigo and Trees, Associates, P.O. Box 769, Durham, NH 03824-0769.

Watson, G.W. and E.B. Himelick. 1997. **Principles and Practice of Planting Trees and Shrubs.** 201 pp. Available from International Society of Arboriculture, P.O. Box 3129, Champaign, IL 61826-3129.

Reynolds, M.K. and R. M. Boivin. 1995. **Selecting Trees For Urban Landscape Ecosystems: Hardy Species For Northern New England Communities.** 104 pp. Available from State of New Hampshire, Department of Resources and Economic Development, Division of Forests and Lands, State Forester's Office, P.O. Box 1856, Concord, NH 03302-1856.

International Society of Arboriculture. 1994. **Buying High Quality Trees.** 4 pp. Available from International Society of Arboriculture, P.O. Box 3129, Champaign, IL 61826-3129.

Dirr, M.A. 1990. **Manual of Woody Landscape Plants.** 1007 pp. Available from Stipes Publishing Company, Champaign, IL 61820.

Mattheck, C. 1996. **Stupsi Introduces the Tree: A Children's Book For Adults.** 99 pp. Available from Arborist Supply House Inc., P.O. Box 23607, Fort Lauderdale, FL 33307.

American National Standards Institute. 1995. **The American National Standard for Tree Care Operations—Tree, Shrub, and Other Woody Plant Maintenance—Standard Practices: ANSI A300.1.** Available from The National Arborist Association, P.O. Box 1094, Amherst, NH 03031-1094; and International Society of Arboriculture, P.O. Box 3129, Champaign, IL 61826-3129.

American Association of Nurserymen. 1997. **American Standard For Nursery Stock: ANSI Z60.1-1996**. 57 pp. Available from American Association of Nurserymen, 1250 I Street, N.W., Suite 500, Washington, D.C. 20005.

American National Standards Institute. 1994. **The American National Standard For Tree Care Operations —Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush—Safety Requirements: ANSI Z133.1-1994.** 22 pp. Available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

The National Arbor Day Foundation. 1998. **How To Prune Young Shade Trees.** (Tree City USA Bulletin No. 1.), 8 pp. Available from The National Arbor Day Foundation, 211 N. 12th Street, Lincoln, NE 68508.

This publication may be used with the companion publication Selecting Trees for Urban Landscape Ecosystems: Hardy Species for Northern New England Communities (Reynolds and Boivin). See "Resources: Tree Selection and Care" above.

DIG SAFE
For toll free local information for all states, call 1•888•258•0808.